No.



9500028

# THE UNIVERD STEAMES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME;

Pioneer Hi-Bred International, Inc.

Thereas, there has been presented to the

## Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED, PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR PORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE PURPOSES, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT BY THE PLANT VARIETY PROTECTION ACT. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

SOYBEAN

'9008'

In Testimonn Murrest, I have hereunto set my hand and caused the seal of the Mant Durista Protection Office to be affixed at the City of Washington, D.C. this thirty-first day of October in the year of our Lord one thousand nine hundred and ninety-five.

Attest:

Marsha a. Stanton

Commissioner Plant Variety Protection Office Agricultural Marketing Service - Histoman Socretary of Agriculture

	·		
U.S. DEPARTMENT ( AGRICULTURAL MA SCIENCE I	RKETING SERVICE DIVISION		Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C.
	VS ON REVERSE)	CTION CERTIFICATE	<ol> <li>2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).</li> </ol>
NAME OF APPLICANT(S) (as it is to appear on the Certificate		<ol> <li>TEMPORARY DESIGNATION OR EXPERIMENTAL NO.</li> </ol>	3. VARIETY NAME
Pioneer Hi-Bred Internationa	l, Inc.		9008
4. ADDRESS (street and no. or R.F.D. no., city, state, and ZIP) 700 Capital Square		5. PHONE (include area code)	FOR OFFICIAL USE ONLY
400 Locust St.			PVPO NUMBER
Des Moines, IA 50309		(515)270-3582	9500028
			NOVEMBER 8, 1994
6. GENUS AND SPECIES NAME	7. FAMILY NAME (	Botanical)	i Time
Glycine max	Legumino	•	G □ A.M. 🗹 P.M.
8. CROP KIND NAME (Common Name)		A DATE OF DETERMINE	F Filing and Examination Fee:
Soybean		9. DATE OF DETERMINATION	E 2,325.00 S Date
		September 1989	
<ol> <li>IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM association, etc.)</li> </ol>	# OF ORGANIZATIO	N (Corporation, partnership,	Certificate Fee:
Corporation			1 3 700 00
11. IF INCORPORATED, GIVE STATE OF INCORPORATION		12. DATE OF INCORPORATION	V JUU
Iowa		1926	l " l a
13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S).	IF ANY, TO SERVE	IN THIS APPLICATION AND RECEIVE A	L SEPTEMBER 5, 1995
John Grace	Mike	Roth (copy)	
7300 NW 62nd Ave.		Capital square, 4	
PO Box 1004	Des	Moines, IA 50309	
Johnston, IA 50131-1004		PHONE (include area code):	
<ul> <li>a Kenibit A, Origin and Breeding History of the Variety</li> <li>b. Exhibit B, Novelty Statement</li> <li>c. Exhibit C, Objective Description of Variety</li> <li>d. Exhibit D, Additional Description of Variety</li> <li>e. Exhibit E, Statement of the Basis of Applicant's Own</li> <li>f. Seed Sample (2,500 viable untreated seeds). Date 3</li> <li>g. Filing and Examination Fee (\$2,325) made payable t</li> </ul>	ership Seed Sample mailed	to Plant Variety Protection Office	10/28/94
<ol> <li>DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VAR Plant Variety Protection Act) YES (If "YES," answer ite</li> </ol>	ETY BE SOLD BY V	ARIETY NAME ONLY AS A CLASS OF	CERTIFIED SEED? (See section 83(a) of the
16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE			
LIMITED AS TO NUMBER OF GENERATIONS?	1 17. (P )		F PRODUCTION BEYOND BREEDER SEED?
18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION	OF THE MADIETY	FOUNDATION REGIS	TERED CERTIFIED
YES (II YES, through   Plant Variety Protection		nt Act. Give date.	).
19. HAS THE VARIETY BEEN RELEASED, USED, OFFERED FOR S YES (If "YES," GIVE NAMES OF COUNTRIES AND DATE	ALE, OR MARKETE	D IN THE U.S. OR OTHER COUNTRIES	57
NO	=S)		
<ol> <li>The applicant(s) declare(s) that a viable sample of basic seeds of such regulations as may be applicable.</li> </ol>	of this variety will be	turnished with the application and will	be replenished upon request in accordance with
The undersigned applicant(s) is (are) the owner(s) of this sexually	y reproduced novel p	plant variety, and believe(s) that the vari	ety is distinct, uniform, and stable as contined
/	or section 42 of file i	"latit Variety Protection Act.	ory to obtained, teleform, and stable as required
Applicant(s) is (are) informed that false representation herein ca	n jeopardize protecti	on and result in penalties.	
IGNATURE OF APPLICANT [Owner(s)]	[	CAPACITY OR TITLE	DATE
			10/4/94
Mysher Tran , The	<u> </u>	Soybean Research Co	pordinator '7/7/
GNATURE OF APPLICANT [Owner(s)]		CAPACITY OR TITLE	DATE
	[	·	
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### EXHIBIT A

Breeding History of Pioneer Brand 9008 Soybean

Year	Activity
1985 (SUMMER)	Cross was made between Pioneer Brand 9061 and Maple Isle.
1985 to 1987	Population was advanced by modified single seed descent.
1988	F5 bulk was planted, single plants were selected and individually threshed.
1989	Seed from individual harvested F5 plants were planted in identified rows. Breeding staff selected the line based on visual appearance from progeny row 1223 in Redwood Falls, Minnesota and designated the line 3981R053.
1990	Preliminary yield trials (test:RFD0E300, entry 36) were initiated in Minnesota. Based upon yield performance, the line was advanced to wide area regional trials in 1991.
1991	Grown in multi-regional trials as W3981R053 (tests: NPA0E000, RFA0E000). Single plants were pulled from a bulk of the line grown in Redwood Falls, Minnesota during the summer.
1991-92 (winter)	Purification rows derived from single plants harvested in 1989 were grown in Chile and offtype sublines discarded.
1992	Second year in wide area tests (designation: Y3981R053; tests: RFA0E000, NPA0E000). A 3.3 acre production block (breeder seed) was grown at Redwood Falls, MN.
1993	Third year in wide area tests (designation: XB008A, tests: RFA0E000, NPA0E000, NPVL2600). A 60 acre parent seed increase (foundation seed equivalent) was grown in Wahpeton, ND.
1994	Based on superior yield performance and early maturity, the line was released as Pioneer Brand 9008.

'9008' has undergone four years of extensive testing and purification. It has been observed by the breeding staff to be uniform and stable for all plant traits from generation to generation, with no evidence of variants.

Exhibit B: Novelty Statement Concerning 9008 Soybean

To our knowledge, '9008' soybean is most similar to '9007', 'Clay', 'Ozzie', and 'Portage'. All of these varieties are have purple flowers, gray pubescence, yellow hila color, and mature as early Group 0 or Group 00 varieties.

However, 9008 can be differentiated from the other four varieties as follows:

- 1. 9008, 9007, Clay, Ozzie, and Portage possess different isozmie profiles (Table 1).
- 2. 9008 is susceptible to Phytophthora races 1, 2, 10, 13, and 17, while 9007 is resistant to these races.
- 9008 has a dull seed coat, while Clay and Portage have shiny seed coats.
- 4. 9008 matures significantly earlier than Clay and Ozzie, and significantly later than Portage (Tables 2, 3, and 4, respectively)

EXHIBIT C (Soybean)

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, MEAT, GRAIN & SEED DIVISION
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MARYLAND 20705

# OBJECTIVE DESCRIPTION OF VARIETY SOYBEAN (Glycine max L.)

•	ARY DESIGNATION VARIETY NAME
Pioneer Hi-Bred International, Inc.	9008
ADDRESS (Street and No., or R.F.D. No., City, State, and Zip Code) 700 Capital Square 400 Locust St. Des Moines, IA 50309	PVPO NUMBER 9500028
Choose the appropriate response which characterizes the variety in the in your answer is fewer than the number of boxes provided, place a ze Starred characters * are considered fundamental to an adequate soybe when information is available.	ro in the first box when number is 9 or less (e.g., 0 9)
1. SEED SHAPE:	
	= Spherical Flattened (L/W ratio > 1.2; L/T ratio = < 1.2) = Elongate Flattened (L/T ratio > 1.2; T/W > 1.2)
2. SEED COAT COLOR: (Mature Seed)	-
1 = Yellow 2 = Green 3 = Brown 4 = Black	k 5 = Other (Specify)
3. SEED COAT LUSTER: (Mature Hand Shelled Seed)	
1 = Dull ('Corsoy 79'; 'Braxton') 2 = Shiny ('Nebsoy'; 'Gasoy	17')
SEED SIZE: (Mature Seed)	
Grams per 100 seeds	
, HILUM COLOR: (Mature Seed)	
2 1 = Buff 2 = Yellow 3 = Brown 4 = Gray	5 = Imperfect Black 6 = Black 7 = Other (Specify)
. COTYLEDON COLOR: (Mature Seed)	
1 1 = Yellow 2 = Green	
. SEED PROTEIN PEROXIDASE ACTIVITY:	
2 1 = Low 2 = High	
SEED PROTEIN ELECTROPHORETIC BAND:	-
1 = Type A (SP1 <sup>a</sup> ) 2 = Type B (SP1 <sup>b</sup> )	
HYPOCOTYL COLOR:	
1 = Green only ('Evans'; 'Davis') 2 = Green with bronze ba 3 = Light Purple below cotyledons ('Beeson'; 'Pickett 71') 4 = Dark Purple extending to unifoliate leaves ('Hodgson'; 'Coker Ham	nd below cotyledons ('Woodworth'; 'Tracy') apton 266A')
. LEAFLET SHAPE:	
LLAI EET SHAFE:	· ·

11.	. LEAF	ET SIZE:						
	2	1 = Small ('Amsoy 71'; 'A5312') 3 = Large ('Crawford'; 'Tracy')	2 = Mediu	m ('Corsoy	79'; 'Gasoy 17')			
12,	LEAF	COLOR:		<u> </u>		·	<u>P</u>	
	2	1 = Light Green ('Weber'; 'York') 3 = Dark Green ('Gnome'; 'Tracy')	2 = Mediu	m Green ('C	Corsoy 79'; 'Braxto	n')		
<b>★</b> 13.	FLOW	ER COLOR:			<u> </u>	<u> </u>	*.	
	2	1 = White 2 = Purple	3 = White wit	h purple the	oat	•		
<b>★</b> 14.	POD C	OLOR:						
	1	1 = Tan 2 = Brown	3 = Black					
<b>★</b> 15.	PLANT	PUBESCENCE COLOR:						
	1	1 = Gray 2 = Brown (Tawny)						
16.	PLANT	TYPES:		-		•		
	2	1 = Slender ('Essex'; 'Amsoy 71') 3 = Bushy ('Gnome'; 'Govan')	2 = Interm	nediate ('Am	ncor'; 'Braxton')			~
<b>★</b> 17.	PLANT	HABIT:						
	3	1 = Determinate ('Gnome'; 'Braxton') 3 = Indeterminate ('Nebsoy'; 'Improved		Determinate	(with)			
<b>★</b> 18.	MATUR	RITY GROUP:						
	0 2	1 = 000 2 = 00 3 = 0 9 = VI 10 = VII 11 = V	4 = I /III 12 = IX	5 = II 13 = X	6 = III	7 = [V	8 = V	
19.	DISEAS	SE REACTION: (Enter 0 = Not Tested; 1	- Susceptible: 2 = Re	esistant)				
		ERIAL DISEASES:		•				
•*	0	Bacterial Pustule (Xanthomonas phaseol	i var. sojensis)		•			
*	1	Bacterial Blight (Pseudomonas glycinea)						
· •		Wildfire (Pseudomonas tabaci)						
^	FUNGA	L DISEASES:						. *
*	1	Brown Spot (Septoria glycines)						
	L	Frogeye Leaf Spot (Cercospora sojina)						
*	0	Race 1 0 Race 2 0	Race 3	Race 4	Race 5	Other	(Specify)	
	0	Target Spot (Corynespora cassiicola)		000 7	עביייייייייייייייייייייייייייייייייייי			
	0	Downy Mildew (Peronospora trifoliorum	ı yar. <i>manshurica</i> l		·			
	0	Powdery Mildew (Microsphaera diffusa)			•			
•		Brown Stem Rot (Cephalosporium gregati	tum)					
^		Stem Canker (Diaporthe phaseolorum va						·
	0	The second of the prosecution va			•			· <b> </b>

19.	DISEA	SE REACTIO	N: (Enter 0 = Not 1	rested; 1 = Susceptib	ile; 2 = Res	sistant) (Co	ntinued)		· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·
-	FUN	GAL DISEAS	ES: (Continued)	•				•			
*		Pod and Ste	m Blight <i>(Diaporthe</i>	phaseolorum var; so	njae)						
4	1		Stain (Cercospora k								
			Root Rot (Rhizoct								
		Phytophtho	ra Rot <i>(Phytophtho</i>	ra megasperma var. se	ojae)				-		
*		Race 1	1 Race 2	1 Race 3	1 R	tace 4	1 Race 5	0	Race 6	_1 F	Race 7
	1	Race 8	1 Race 9.	1 Other (Spec	ify) 10	<u>, 13, </u>	17, 19,	21		_	
-	VIRA	L DISEASES	:	•							
	1	Bud Blight (	Tobacco Ringspot V	'irus)							
-	1	Yellow Mosa	ic (Bean Yellow Mo	saic Virus)	•						
*		Cowpea Mos	aic (Cowpea Chloro	tic Virus)				÷			
		Pod Mottle (	Bean Pod Mottle Vii	rus)							
*,		Seed Mottle	(Soybean Mosaic Vi	rus)				•			
	NEMA	ATODE DISE	ASES:		-						
		Soybean Cys	t Nematode (Hetero	dera glycines)	•					ė.	,
*	0	Race 1	Race 2	1 Race 3	0 R	ace 4	Other (	Specify)			
	0	Lance Nemat	ode (Hoplolaimus C	colombus)							_
*	0	Southern Ro	ot Knot Nematode (	Meloidogyne incogni	ita)	*					
*	0	Northern Roo	ot Knot Nematode (	Meloidogyne Hapla)	• .						
	0	Peanut Root	Knot Nematode ( <i>Me</i>	eloidogyne arenaria)							
		Reniform Ne	matode <i>(Rotylenchu</i>	ılus reniformis)							
			ASE NOT ON FOR		White	Mold	(sclere	otinia	scler	otior	um)
20. F	HYSIOL	OGICAL RE	SPONSES: (Enter (	= Not Tested; 1 = S	Susceptible	; 2 = Resista	ant)			_	
*	1	Iron Chlorosis	on Calcareous Soil								
		Other <i>(Specif</i> )	v)								
21. I	NSECT I	REACTION:	(Enter 0 = Not Test	ed; 1 = Susceptible;	2 = Resista	ant)					
			Beetle (Epilachna v								
			opper (Empoasca fa								
		e <sup>t</sup>	v)						·		
22. II	NDICAT	E WHICH VA	RIETY MOST CLO	SELY RESEMBLES	THAT SI	JRMITTED					
<del></del> -	CHARA		I	OF VARIETY		CHARA	<del></del>		NAME O	ENABLET	
PI	ant Shap	<del></del>	9007			Seed Coat		9061		FVARIET	1
Ļ	af Shape	·	Clay			Seed Size		McCa	<del></del>		<del></del>
Le	af Color		9071			Seed Shape	•	McCa			
L,e	af Size		Clay			<u>·</u>	gmentation	9061	н		
							•				l

## 23. GIVE DATA FOR SUBMITTED AND SIMILAR STANDARD VARIETY: Paired Comparison Data

VARIETY	NO. OF DAYS	PLANT LODGING	CM PLANT	LEAFL	ET SIZE	SEED CO	NTENT	SEED SIZE G/100	NO. SEEDS/
	MATURITY	SCORE	HEIGHT	CM Width	CM Length	% Protein	% Oil	SEEDS	POD
9008 Submitted	119.5		31	4.2	8.3	41.3	21.9	13.5	
Clay Name of Similar Variety	124.5	1	34	4.7	8.7	44.1	21.0	14.7	

## PUBLICATIONS USEFUL AS REFERENCE AIDS FOR COMPLETING THIS FORM:

- 1. Caldwell, B.E., ed. 1973. Soybeans: Improvement, Production, and Uses. Amer. Soc. Agron. Monograph No. 16.
- 2. Buttery, B.R. and R.I. Buzzell. 1968. Peroxidase activity in seeds of soybean varieties. Crop Sci., 8: 722-725.
- 3. Hymowitz, T. 1973. Electrophoretic analysis of SBTI-A<sub>2</sub> in the USDA soybean germplasm collection. Crop Sci., 13: 420-421.
- 4. Payne, R.C. and L.F. Morris. 1976. Differentiation of soybean cultivars by seedling pigmentation patterns. J. Seed Technol. 1: 1-19.

### Exhibit D:

In Exhibit C we have identified 9008 as susceptible to bacterial blight, brown spot, pod and stem blight, rhizoctonia root rot, bud blight, yellow mosaic, cowpea mosaic, pod mottle, and seed mottle. This does not mean that we consider 9008 to be worse than other varieties of similar maturity in reaction to these challenges. Rather, we do not consider 9008 to be immune to them. Therefore, we have chosen to be conservative and have identified 9008 as "susceptible".

Variety 9008 is a late group 00 variety.

### Exhibit E.

Variety '9008' was originated and developed by plant breeders from whom, by agreement, Pioneer Hi-Bred International has obtained exclusive rights to protect and market variety '9008'. No rights to such invention, discovery, or development are retained by the plant breeders or by any other party.

Table 1. Isozyme profiles for 9008, 9007, Clay, Ozzie, and Portage.

Variety					Isoz	ymes						
	ACO2	ACO3	ACO4	ACP	DIA	ENP	IDH1	IDH2	MDH	MPI	PGM1	PHI1
				A	llele	desi	gnatio	n		·		
9008	2	1	1	Α	A	Α	1	2	Α	A	1	1
9007	2	1	3	Α	Α	В	1	2	Α	В	_	2
Clay	2	1	3	Α	В	A	2	2	В	Ā	1	. ī
Ozzie	2	1	3	Α	В	Α	2	1	Ā	В	2	1
Portage	2	1	3	A	A	В	1	=	A	Ā	2	2

## Key:

Aconitase: ACO2, ACO3, ACO4

Acid Phosphatase: ACP

Diaphorase: DIA Endopeptidase: ENP

Isocitrate Dehydrogenase: IDH1, IDH2

Malate Dehydrogenase: MDH

Mannose 6-Phosphate Isomerase: MPI

Phosphoglucomutase: PGM

Phosphoglucose Isomerase: PHI

Table 2. Paired comparison of 9008 versus Clay for days to maturity.

All observations are from plots planted using a randomized complete block design. Planted plot length was 21 feet, trimmed to 15 feet. Plot width was 30 inch rows, or 10 feet. Maturity was scored as the number of days from planting until 95% of the pods in the plot were mature. Data was taken in 1993.

Year,	/Location/Rep	9008 (X1)	Clay (X2)	(X1-X2)	( <b>x1-x2</b> ) <sup>2</sup>
•		da	ys		
1993	106D Rep 1	118.0	123.0	-5.0	25.00
1993	106D Rep 2	125.0	126.0	-1.0	1.00
1993	106D Rep 3	119.0	124.0	-5.0	25.00
1993	106D Rep 4	116.0	125.0	-9.0	81.00
1993	106I Rep 1	115.0	120.0	-5.0	25.00
1993	106I Rep 2	115.0	120.0	-5.0	25.00
1993	106I Rep 3	116.0	119.0	-3.0	9.00
1993	106I Rep 4	116.0	120.0	-4.0	16.00
SUM		940.0	977.0	-37.0	207.00
MEAN		117.5	122.1	-4.6	<b>-</b> ₫

N = 8 groups of individuals

SE DIFF 
$$(s_{\overline{d}}) = \frac{207 - [(-37.0)^2/8]}{(8)(7)} = 0.80$$

$$T = |\overline{d}/s_{\overline{d}}| = \frac{4.6}{0.80} = 5.78, \text{ significant for 7 degrees of freedom at the 0.001 level.}$$

Table 3. Paired comparison of 9008 versus Ozzie for days to maturity.

All observations are from plots planted using a randomized complete block design. Planted plot length was 21 feet, trimmed to 15 feet. Plot width was 30 inch rows, or 10 feet. Maturity was scored as the number of days from planting until 95% of the pods in the plot were mature. Data was taken in 1993.

Year/	/Location/Rep	9008 (X1)	Ozzie (X2)	(X1-X2)	(x1-x2) <sup>2</sup>
		days			
1993	106D Rep 1	118.0	125.0	-7.0	49.00
1993	106D Rep 2	125.0	126.0	-1.0	1.00
1993	106D Rep 3	119.0	126.0	-7.0	49.00
1993	106D Rep 4	116.0	128.0	-12.0	144.00
1993	106I Rep 1	115.0	120.0	-5.0	25.00
1993	106I Rep 2	115.0	120.0	-5.0	25.00
1993	106I Rep 3	116.0	121.0	-5.0	25.00
1993	1061 Rep 4	116.0	122.0	-6.0	36.00
SUM		940.0	988.0	-48.0	354.00
MEAN		117.5	123.5	-6.0 =	• <u>a</u>

N = 8 groups of individuals

SE DIFF 
$$(s_{\overline{d}}) = \frac{354 - [(-48)^2/8]}{(8)(7)} = 1.09$$
 $T = |\overline{d}/s_{\overline{d}}| = \frac{6.0}{1.09} = 5.53$ , significant for 7 degrees of freedom at the 0.001 level.

Table 4. Paired comparison of 9008 versus Portage for days to maturity.

All observations are from plots planted using a randomized complete block design. Planted plot length was 21 feet, trimmed to 15 feet. Plot width was 30 inch rows, or 10 feet. Maturity was scored as the number of days from planting until 95% of the pods in the plot were mature. Data was taken in 1993.

Year/Location/Rep	9008 (X1) Por	tage (X2)	$(X1-X2)$ $(X1-X2)^2$		
	days			·	
1993 106D Rep 1	118.0	111.0	7.0	49.00	
1993 106D Rep 2	125.0	112.0	13.0	169.00	
1993 106D Rep 3	119.0	114.0	5.0	25.00	
1993 106D Rep 4	116.0	115.0	1.0	1.00	
1993 106I Rep 1	115.0	109.0	6.0	36.00	
1993 106I Rep 2	115.0	109.0	6.0	36.00	
1993 106I Rep 3	116.0	108.0	8.0	64.00	
1993 1061 Rep 4	116.0	111.0	5.0	25.00	
SUM	940.0	889.0	51.0	405.00	
MEAN	117.5	111.1	6.4 =	∙ <b>ā</b>	

N = 8 groups of individuals

SE DIFF 
$$(s_{\overline{d}}) = \frac{405 - [(51)^2/8]}{(8)(7)} = 1.19$$

$$T = |\overline{d}/s_{\overline{d}}| = \frac{6.4}{1.19} = 5.34, \text{ significant for 7 degrees of freedom at the 0.01 level}$$